ADL-function in late life. A matter of gender roles or objective function?

Marie Ernsth Bravell[1], Elizabeth Braungart Fauth[2], Denis Gerstorf[3], Nilam Ram[4]

[1] Institute of Gerontology, Jönköping University, Sweden
[2] Department of Family, Consumer, and Human Development, Utah State University
[3] Institute of Psychology, Humboldt University Berlin, Germany
[4] Department of Human Development and Family Studies, Penn State University

Abstract

Most studies find that females experience and suffer from disability more than men. The aim of this study is to examine gender differences in subjective and objective function over time and explore if those differences may be in part attributed to other factors besides socially constructed gender roles. Applying growth curve models to data pooled from four Swedish studies of individuals aged 70-100+ (N=1,067), measured every two years for up to five occasions of measurement, we modeled gender differences in trajectories of both objective functioning, grip strength, and subjective functioning, self-report of Instrumental Activities of Daily Living (IADL). We examined if and how these differences might be explained by demographic characteristics, memory recall, social support, multimorbidity, lung function and grip strength. The results for objective functioning suggest that women initially perform lower on grip strength, but longitudinally men demonstrate a steeper decline. Lung function followed a similar pattern. Higher education relates to steeper decline whereas better recall and less medication predicted less steep decline. In subjective functioning, women initially reported higher IADLs. We conclude that there are gender differences in both objective and subjective measures of function, and that the lower subjective ratings of function in women may be due in part to lower objective function. Future research is encouraged to consider further if and how gender serves as a proxy variable for the underlying processes that contribute to changes in function.

Background

Sufficient performance of activities in daily life (ADL) is essential for independent living in advanced ages. Models of disability suggest that chronic diseases and/or acute medical events initiate functional limitation in body systems. When these limitations inhibit a person from functioning independently in their surrounding environment, a disability is present (e.g. Verbrugge and Jette, 1994; Iwarsson 2005). Gerontological research of disability typically assesses *functional impairment* via objective performance on functional tasks, such as a person's ability to walk or stand from a chair, as well as their performance in grip strength and lung function (Fauth et al., 2007). Most studies that measure *disability* use self-reports of PADL function, the ability to do personal care (eating, dressing, bathing), or IADL function, the ability to perform tasks in instrumental daily life activities (shopping, cooking, cleaning).

Dispite the common use of ADL assessments, several items, particularly in the IADL measures, are dependent on gender, culture, housing conditions, and leisure time interest, and not only somatic function. Several authors (e.g. Deeg 1993; Larsson 2006) suggest that dependence in IADL ability is just as much due to different gender roles, as due to somatic impairments.

Objective measures of function, on the other hand, are probably more accurate at capturing a true impairment in somatic function, but assessments of physical performance on specific tasks have both advantages and disadvantages, for example they may require specialized equipment, like a vigorometer or spirometer.

Better understanding of the gender differences in objective and subjective functional performance are needed, including both cross-sectional and longitudinal comparisons. In addition, psychosocial indicators can be used to explain the variance in gender differences of functional ability.

Research Question

We examine gender differences in self-reported disability (IADL function), and two indices of functional performance (grip strength and lung function), exploring the role of a number of between-person difference variables, including sociodemographics (age, education, widowhood, being institutionalized, and having died over the course of the study) as well as cognitive ability, social support, and health.

Methods

Participants/Procedures: Four Swedish longitudinal, population-based studies (GENDER, OCTO, OCTO-TWIN, and NONA) were combined into one large dataset with a total *N* = 1067; with initial ages at baseline ranging from 70-100

- GENDER surveyed unlike-sex twins age 70+ (sampled from Swedish population)
- OCTO-Twin surveyed mono-zygotic and di-zygotic twins age 80+, (sampled from Swedish population)
- OCTO studied individuals age 84+ (sampled from greater Jönköping municipality in southern Sweden)
- NONA studied individuals aged 86+ (sampled from greater Jönköping municipality)

Each study captured nearly identical multidisciplinary measures over 3-5 waves of follow-up (nurse assessments occurred every 2 years; 4 years in GENDER). Participants lived in ordinary housing and institutions.

Measures

Sociodemographics included age, years of education, marital status, institutionalization status , having died over the course of the study, and study membership (GENDER, OCTO, OCTO-Twin, NONA)

Cognitive ability. Delayed (30 minute) memory recall (a subtest of the Memory In Reality test; Johansson, 1988/1989) was used to assess one aspect of cognitive functioning.

Multimorbidity. Nurse interviewers asked participants whether a list of diseases and conditions were present. When necessary, family informants were also included for information (see Gold et al., 2002). Eleven diagnoses and conditions were included: arthritis, hip fracture, osteoporosis, stroke, heart attack, chest pain/angina, diabetes, asthma, coughing with yellow phlegm, cancer, and Parkinson's disease. A count of the conditions listed yielded our score for multimorbidity.

Social support was assessed using four items from the UCLA Loneliness Scale (Russell, 1982), and one global social support item. Questions assessed the extent to which participants felt they had someone to talk to, felt apart of a circle of friends, and their general levels in which they felt supported.

ADL Impairment. Subjective impairment on daily activities was assessed using self-report on *Instrumental Activities of Daily Living*. Four IADL items were included across all four studies; individuals' ability to clean the house, cook, shop, and go places out of walking distance/use transportation. Impairment was measured using a 4-point scale ranging from 0 (completely independent) to 3 (unable to do the activity at all).

Grip strength. Grip strength has often been used as an index of physical function because it relates to total body mass and the strength of muscles in the arms, legs, and trunk. Participants squeezed a vigorometer 3 times with each hand, and the maximum score was used.

Lung function. Lung function is considered a good biomarker of functional ability. In the current project, lung function was assessed via peak expiratory flow using a spirometer.

Analyzes

Models were estimated using SAS. Growth Curve Models were performed to analyze longitudinal gender differences in performance based measures of function; grip strength and lung function. Logistic regression models were performed to analyze factors related to self-reported IADL in interaction with gender. The outcome variable in the logistic regression models were dichotomized IADL-function (0 = no problems/completely independent, 1 = problems to perform one or more of the investigated IADL activities).

Results

Performance-based function: Grip strength and lung function

The results demonstrate that women initially perform lower on grip strength, but longitudinally men demonstrate a steeper decline. Higher education relates to a steeper decline whereas better recall and less medication relates to less decline in grip strength in both men and women. Women also perform lower on lung function at baseline. Both women and men decline in lung function over time but the decline is steeper from men. Older age, being less educated, institutionalized, having died all relates to shallower decline in lung function.

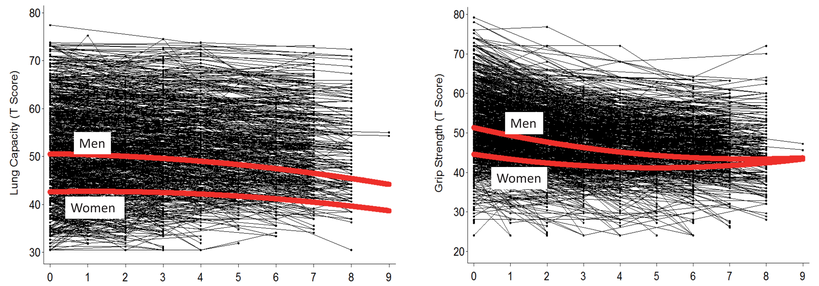

Figure 1a and 1b. Gender differences in the trajectories of lungfunction and grip strength.

Self-reported IADL-function

At baseline 38% of the men are disabled in IADL compared to 48% of the women. Women also have higher risks of being among those who have IADL limitations, RR = 1.5 that of men. The results hold when including age, education, marital status, institutionalized, being dead now, cognition, social embedding, and number of diagnoses. Gender differences were accounted for by objective indices of functional performance: grip strength or lung function (not presented in Table 1: OR=0.95, CI = 0.93-0.97).

Table 1. Logistic regression with self-reported IADL as outcome.

	Baseline	With objective
	OR (95% CI)	OR (95% CI)
Gender	**1.43 (1.05-1.96)**	0.95 (0.67-1.32)
Age	**1.08 (1.02-1.2)**	**1.08 (1.02-1.14**)
Education	0.97 (0.91-1.04)	0.97 (0.91-1.03)
Marital status	0.96 (0.83-1.11)	0.97 (0.84-1.11)
Institutionalization	**5.52 (2.62-11.66)**	**6.04 (3.01-12.13)**
Dead now	**2.36 (1.58-3.53)**	**2.64 (1.78-3.88)**
Cognition	**0.96 (0.95-0.98)**	
Social embedding	**0.96 (0.95-0.98)**	
Nr. of Diagnoses	**1.56 (1.39-1.78)**	
Grip strength		**0.94 (0.92-0.96)**

Discussion and Conclusion

We found evidence of gender differences in objective but not in the subjective measures of function. While we do not rule out that gender roles influence performance in activities typically included in assessments of IADL function, the results here suggest that gender differences in function may be driven by differences in physical conditions.

Future research should fully explore the social contributions of gender roles on functional ability by specifically including measures of gender roles, rather than general psychosocial factors.

Acknowledgements: We appreciate support from NIH grant 5R21AG033109-02. We also thank the large team of researchers and the funding sources for the original studies: NIH/NIA Grant RO3 AG028471-01, European Union project contract no. QLK6-CT-2001-02283; Research Board in the County Council of Jönköping; FORSS; NIA grant AG-08861; MacArthur Foundation Research Network on Successful Aging; The Axel and Margaret Ax:son Johnson's Foundation; Swedish Council for Social Research; Swedish Foundation for Health Care Sciences and Allergy Research; and NIA Grant: T32 AG20500